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70.10446

13
DEMANDE
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71 Déposant : GUICHARD Maurice, 4, rue Jean-Pierre-Calloc'h, 56-Auray.

Titulaire : *Idem* 71

74 Mandataire :

54 Structures complexes à ame ondulée simple ou multiple, en résine thermoplastique expansée ou non, avec assemblage par contact, en continu sur les deux faces, d'une feuille en résine thermoplastique de qualité identique ou différente, ou en toute autre matière; procédés de fabrication en continu de ces structures.

72 Invention de :

33 32 31 Priorité conventionnelle :

un réglage indépendant de chaque partie du conformateur, on pourra, pour les besoins éventuels de la fabrication, obtenir une pré-solidification différente sur chaque face de l'ame ondulée. Le point essentiel de ce stade de la fabrication est de donner à la structure une rigidité relative tout en lui conservant sa qualité d'auto-adhérence par simple contact.

Ce conformateur peut être de différents types, suivant les besoins ou les moyens choisis : soit un bloc massif, soit un assemblage de tubulures de diamètre semblable à celui de la canelure, soit un ensemble groupant les deux types pré-cités.

10 - 3°/ Fabrication en un point convenablement disposé, par l'un quelconque des moyens classiques ou autres, de deux feuilles indépendantes l'une de l'autre, chaque feuille ou film pouvant être de matière ou d'épaisseur différente de celles de l'autre si nécessaire, pour obtenir une structure de qualités bien définies ; cette unité de fabrication pouvant être éventuellement remplacée par l'emploi de rouleaux de film pré-fabriqués, auquel cas, il peut alors apparaître nécessaire, pour des raisons de retrait de la matière première, d'effectuer un passage continu du film entre des éléments chauffants pour équilibrer les températures.

15 - 4°/ Application en un point défini, simultanément ou en position étagée, des deux films sur la structure ondulée ; le contact et l'adhérence étant déterminés par la condition suivante : l'ame ondulée devra présenter une rigidité relative, tout en ayant conservé une adhérence suffisante en surface pour permettre d'appliquer intimement de chaque côté un film par simple contact, cette application pouvant se faire à l'entrée d'un conformateur réfrigéré, soit directement, soit par l'intermédiaire de rouleaux de contact ; pour obtenir une meilleure tenue de la structure ondulée au moment de l'application des deux films, on pourra adjoindre un système de tubulures injectant de l'air comprimé à basse pression, de façon à mettre la structure en léger gonflement au moment du passage dans le conformateur final, on pourra également pour améliorer ses qualités utiliser d'autres substances, par exemple une mousse à plusieurs composants venant s'expandre et se polymériser pendant le passage de la structure dans le conformateur ; chacune de ces possibilités pouvant d'ailleurs être employée séparément ou simultanément. A noter que les opérations de cette application peuvent être inversées c'est à dire que l'on pourrait à l'inverse de ce qui précède appliquer les deux films restés adhérents en surface sur l'ame ondulée refroidie.

DESSINS EXPLICATIFS PL I-5 à PL V - 5

Fig 1 - vue schématique d'une filière à canelure simple avec dispositif

en carton ondulé . D'autre part, sans que cela soit prépondérant ce système de fabrication peut permettre d'employer un film coloré ou d'aspect granité pour la face extérieure d'un emballage de présentation, de même que les qualités définies ci-dessus pourront permettre l'emballage direct de

5 produits qui ne pouvaient être expédiés dans un seul emballage en carton .

Certains autres débouchés peuvent être envisagés : par exemple, des panneaux d'isolation de toute nature ; ceci dépendant uniquement des matières de base choisies ou des produits complémentaires ajoutés .

Fig.1

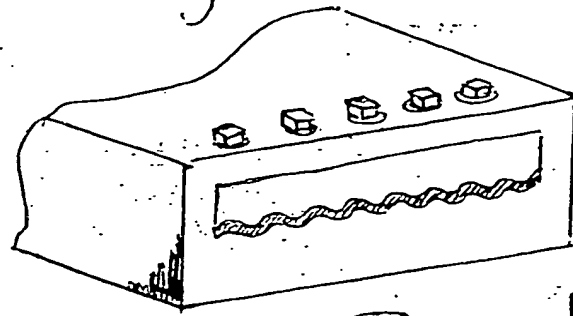


FIG.2

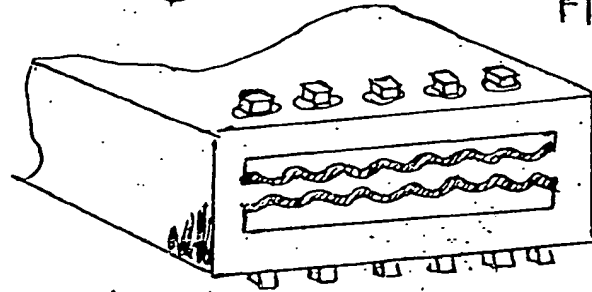


FIG.3

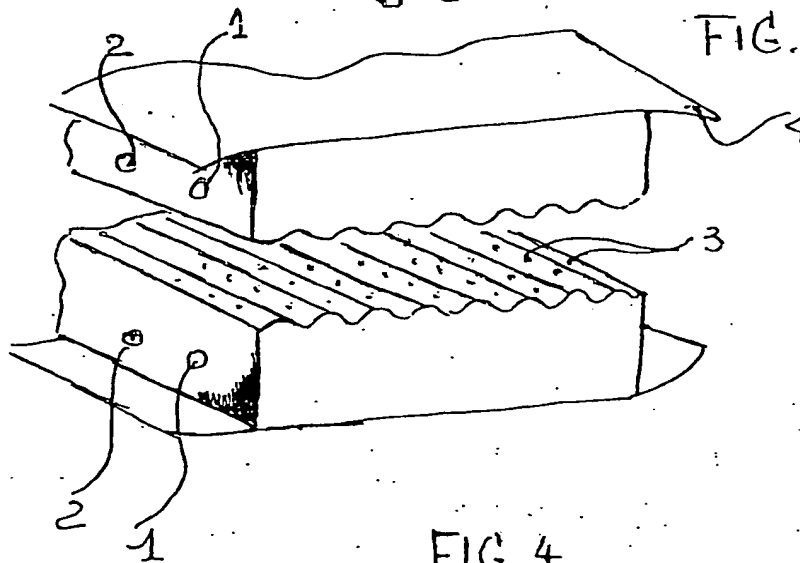


FIG.4

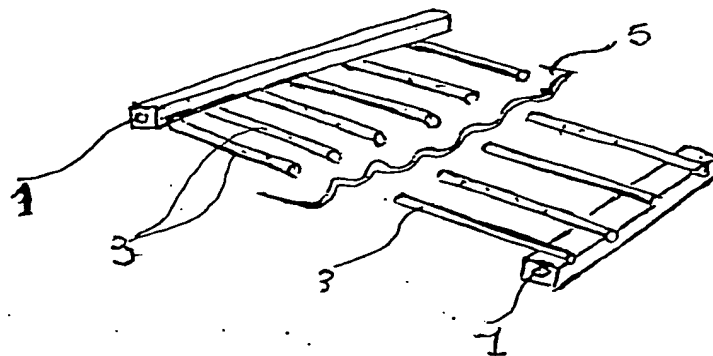


FIG. 8

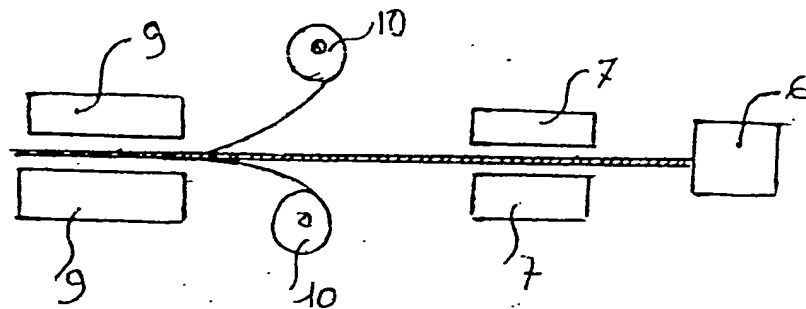


FIG. 9

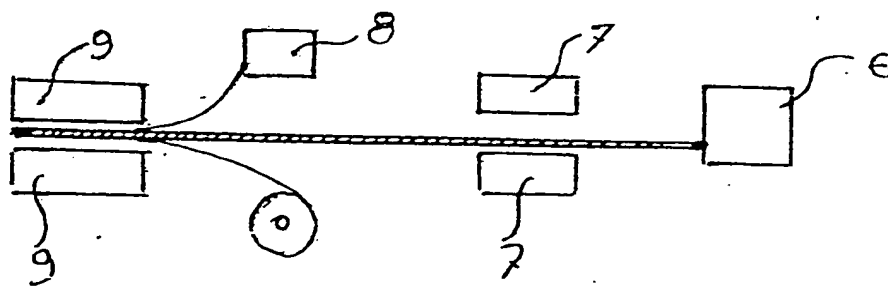


FIG. 10

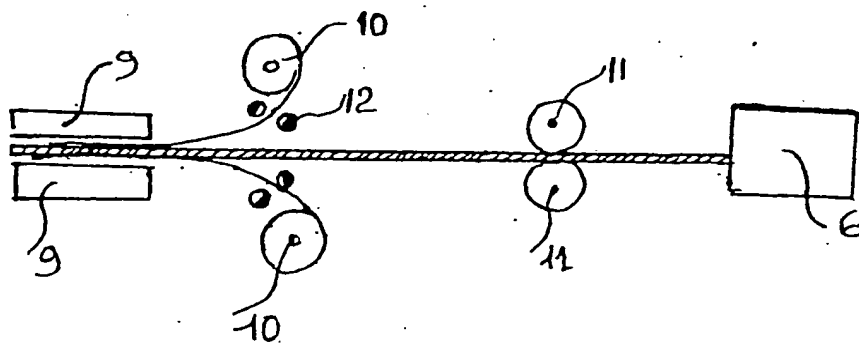


FIG. 13



FIG. 14



FIG. 15

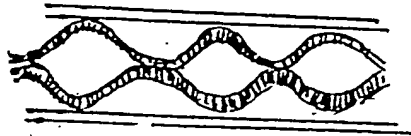


FIG. 16



FIG. 17

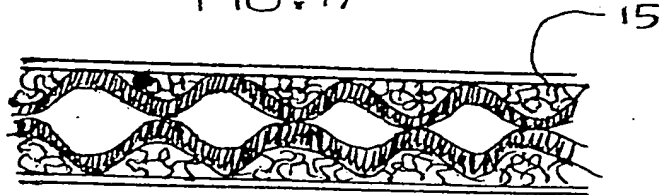
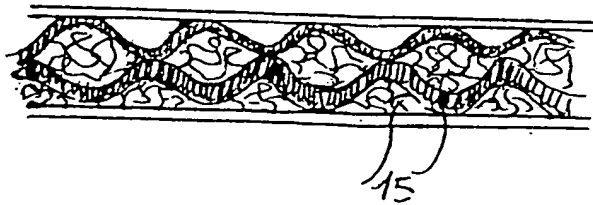


FIG. 18



FRENCH PATENT APPLICATION NR 70.10446
PUBLICATION NR 2.081.256

5 COMPLEX STRUCTURES INCLUDING A WEB WITH SIMPLE OR MULTIPLE
CORRUGATIONS, OF EXPANDED OR NOT EXPANDED THERMOPLASTIC
RESINS, BEING ASSEMBLED BY CONTINUOUS CONTACT ON BOTH
FACES WITH A FILM OF THERMOPLASTIC RESIN OF IDENTICAL OR DIFFERENT
QUALITIES, OR OF ANY OTHER MATERIAL ;
10 METHODS FOR CONTINUOUSLY FABRICATING SAID STRUCTURES.

Up to now, light structures from plastic materials have been obtained, either in non traditional form or by manufacturing procedures comprising a film incorporated on one face, and fixation by gluing or by repeated fusion,
15 of a second film on the other face of the corrugated web; besides the forms of said structures are not well suited for obtaining a final product allowing for use of equipment which already exists for the other materials which in particular are intended for use in packing.

The present invention provides corrugated structures of the simple
20 or multiple channel type, with immediate assembly of two films on both faces by simple contact at the outlet side of the fabricating machine; This arrangement having a light complex structure with a corrugated web, having variable weight and qualities depending on the choice of materials or the choice of thickness, said variations, mutually independent, being possible to obtain
25 without any harm with respect to the continuous execution of said structure.

This invention is characterized by the following points:

-1/ Continuously fabricating a corrugated web, which directly at the outlet end of the drawing block presents a simple or multiple structure of the type having
30 channels extending in parallel in the direction of the unwinding of the film; the ratio -height - width - thickness -being a function of the tool equipment chosen and only being determined by the qualities to be obtained; the width of said structure being delimited by the dimensions of the film; the very quality of this corrugated web being a function of the quality of the material
35 used, which might be any of the resins used for extrusion, with all possibilities of incorporating in said material of products intended to modify the qualities thereof, or expansion products; in the same manner as it will be possible, independently of the thickness adjustments, to exercise a longitudinal tension of said corrugated web at the outlet of the drawing block.

40 -2/ Continuous passage for the structure thus obtained in a first forming device with cooling by liquid refrigerant or a forming device with a very low pressure

air cushion , said air cushion being obtained via orifices suitably disposed on the surface of the forming device in contact with the structure; said passage being intended for obtaining a pre-solidification of the structure during a progress at high velocity ; by a control independent of each part of the forming device, it will be possible, for any possible demand in the fabrication , to obtain
5 a different pre-solidification at each face of the corrugated web. The essential point of this phase of the fabrication is to provide the structure with a relative stiffness , at the same time retaining its capacity of automatic-adherence by simple contact. Said forming device may be of different types, in dependence
10 of the needs or the means chosen : namely a massive bloc, or an assembly of tubes of a diameter similar to the diameter of the channels, or by an arrangement grouping together both types mentioned previously.

-3/ Fabrication at a point suitably disposed, by means of any conventional or
15 other means, of two films , independent of each other, each foil or film may be of a material or a thickness other than the material or thickness of the other film , if necessary , to obtain a structure having well defined qualities; said fabrication unit may possibly be replaced by using rollers with pre-fabricated film, in which case it may be necessary , for the reasons of extracting of the
20 primary material, to provide a continuous film passage between heating elements in order to equalize the temperatures.

-4/ Application in a defined point, simultaneously or in a position one above
25 the other, of two films on the corrugated structure ; the contact and adherence being determined by the following conditions : the corrugated web should present a relative rigidity, at the same time retaining sufficient surface adherence to allow intimate application of a film on each side by simple contact, said application being possible to perform at the entrance of a refrigerated forming device, either directly or by the use of contact rollers ; in order to obtain im-
30 proved quality of the corrugated structure at the moment of application of both films, it is possible to add a system of tubes injecting compressed air at low pressure, in order to provide the structure with a light expansion at the final passage in the forming device ; in order to improve its qualities it should also be possible, to use other substances , e g a foam having several components
35 which expand and polymerize during the passage of the structure in the forming device ; each one of said possibilities could also be used separately or simultaneously. It should be noted that the operations of this application could be inverted, e g that it is possible, inversely to what is said previously , to apply both films which have remained surface- adherent on the refrigerated corru-
40 gated web.

EXPLANATORY DRAWINGS

- Fig 1 - schematical view of a drawing block with simple channels and means for thickness adjustment
- 5 Fig 2 - schematic view of an drawing block with double channels and means for independently adjusting the thickness of the channels (equalizing means not shown)
- 10 Fig 3 - pre-forming device of massive type , for simple corrugated structure :
1) entry of the refrigerating circuit, 2) compressed air circuit ,
2) outlet of compressed air. 4) deflector.
- Fig 4 - pre-forming device of tubular type , for simple corrugation :
15 5) disposition of the passage of the structure
- Fig 5 - step by step pre conformer of the tubular type for double structure
- Fig 6 - sectional view of a terraced pre- conformer.
- 20 Fig 7 - diagram of an installation :
6) drawing block, principle of a corrugated web , 7) pre conformer
7) secondary drawing block for covering film, 9) refrigerated vacuum conformer.
- 25 Fig 8 - variant of the diagram of the installation principle :
10) roller with film coming into contact with the corrugated structure.
- Fig 9 - the same variant , but using a roller with film and a secondary drawing
30 block .
- Fig 10- installation using a pre-conformer with rollers (11) and elements for pre-
35 heating the films during unrolling (12) .
- Fig 11- installation without pre-conformer, with expansion via tubes (13) at the moment of assembly via refrigerated pressure rollers (14) .
- 40 Fig 12- diagram of fabrication of a double structure with assembly via terraced contact and internal expansion of each structure :

Fig 13-structure obtained by said techniques.

- 5 Fig 14-variant obtained by higher pressure on the pressure rollers and by using a pre-conformer of determined form .

Fig 15-double structure .

- 10 Fig 16- simple structure with replenishment on one surface (15) of a foam .

Fig 17and 18 - variants obtained with double structures .

15 The industrial possibilities of light structures of the corrugated type of plastic material are very important due to the characteristic properties which said material can add, compared to structures from corrugated cardboard : rigidity, resistivity, alimentary quality in relation to use with food products depending on the use of materials, isothermal properties, moisture resistance, very low ratio weight / surface , which renders possible the execution of
20 package having a better resistance and a lower weight compared with those of the same kind, but made of corrugated cardboard . On the other hand, without this being decisive, this system of fabrication may allow for the use of a colored film or a film having a woven aspect , on the outer surface of a showing wrapping , in the same manner as the qualities defined above can allow for
25 direct wrapping of products which could not be expedited in one single box of cardboard.

Certain other marketing possibilities can be expected : for example insulation panels of all kinds ; this depending only on the base material used or
30 on the complementary products added.

CLAIMS

5

I request a patent of invention concerning the fabrication and exploitation of light structures from plastics materials comprising :

- 10 -1) an internal web having corrugated form obtained directly by using a drawing block, said web being of the type having simple or double channels , the primary material being selected in dependence of the characteristics for obtaining additive products or expansion products which , in case of possible needs , may be mixed with the base material.
- 15 -2) two plastic films or of any material, for direct coverage by simple adhesion on each face of the corrugated web, so as to form a light complex structure with well defined characteristics with respect to the form , the thickness may differ from one film to the other, the character of the material used for said films and even the exterior aspects thereof .
- 20 -3) continuously fixing both covering films on the corrugated web without using any complementary product, adhesion being obtained only due to the state of the material preserved, either on two faces of the corrugated web, or on the surface of both of the covering films, which by simple application of the elements against each other, firmly attaching them to each other, forming an
- 25 automatic adhesion of the set.
- 4) the methods of continuously fabricating said structures as well as the special equipment derived from my technique.
- 30

35